

(12)

## EUROPEAN PATENT APPLICATION

(43) Date of publication:  
29.03.2000 Official Gazette 2000/13

(51) Int Cl.<sup>7</sup>: B23Q 1/76

(21) Application number: 99890272.0

(22) Application date: 25.08.1999

(84) Named contracting states:  
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU  
MC NL PT SE  
Named extension states:  
AL LT LV MK RO SI

(30) Priority: 26.08.1998 AT 144798

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### (54) Steady rest

(57) Steady rest for supporting the free end of long and principally cylindrical workpieces on a machine tool, in which the steady rest possesses at least two support rollers (3), these support rollers (3) being rotatably mounted in legs (4), the legs (4) being held in a pivoting mounting at the ends facing away from the support rollers (3), and with a fixture provided

between the legs (4) which enables the angle between the legs to be changed and fixed.

The invention is characterized in that the fixing fixture is an spindle fixture (5) which, in a preferred embodiment engages on both legs (4).

The subordinate claims relate to a particularly robust and straightforward centering fixture.

## Description

[0001] The present invention concerns a steady rest for supporting the free end of long and principally cylindrical workpieces on a machine tool with at least two support rollers that are rotatably mounted in legs, in which the legs are held in a pivoting mounting at the ends facing away from the support rollers and with a fixing fixture provided in between the legs by means of which the angle between the legs can be altered and fixed.

[0002] A fixture of this type is disclosed in US 4,463,635. However, that fixture is only conceivable with three support rollers, since it is the objective of the publication for the object to be supported to be axially secured, something which requires at least three support rollers. In order to hold these three support rollers reliably at an equal radial distance from the axis of rotation, one is only moved radially (linear) and a symmetrical mechanism is used for moving the two other support rollers accordingly that are each arranged on a pivoting lever. This mechanism together with the central support roller is also the fixing mechanism.

[0003] The complicated structure of the fixture is disadvantageous, since it is difficult to adjust and to maintain, while the associated investment and maintenance costs are high.

[0004] The workpiece is generally clamped on both sides in such machines, for example lathes, as well as other machine tools, or alternatively it is clamped on one side and held centered against a pin or the like. Only in the case of small workpieces is it possible to use single-sided clamping alone with the other end of the workpiece projecting freely into the working area.

[0005] In woodworking and in other applications, the problem arises of having to process workpieces that, under certain circumstances, deviate markedly from the cylindrical shape and have, in some cases, a crooked axis at the same time, with the result that it is only possible to discuss them as approaching the cylindrical shape. In these cases too, it is also necessary to support and bear the free end, this being the term used in the following document to refer to the end onto which no torque is transmitted. This is completely impossible with the fixture stated initially, for example.

[0006] Other fixtures similar to the one stated above are disclosed in US-A-4,177,701 and US-A-4,517,866. The former does not have the support rollers mounted on pivoting levers, the latter moves and fixes the pivoting levers of the support rollers individually.

[0007] The objective of the present invention is to provide a straightforward and robust steady rest, and in particular a steady rest suitable for processing relatively curved workpieces, for example in woodworking.

[0008] In order to achieve this, the invention provides for a steady rest of the aforementioned type in which the fixing fixture is a spindle fixture which, in a preferred embodiment, engages on both legs.

[0009] One preferred application area is that of spigot shaping machines for round or shaped wood in pole form, in which case the workpiece preferably turns slowly.

[0010] As a special feature for stabilization, the ends of the legs facing away from the support rollers carry toothed segments or possess toothed segments running concentrically to their pivoting axes by means of which the symmetrical position of the two legs is assured.

[0011] The invention is explained in more detail in the drawing, in which

Fig. 1 shows a fixture configured in accordance with the present invention, in a view along the axis of the workpiece to be processed and

Fig. 2 shows a view in the direction of the arrow II in Fig. 1.

[0012] A long workpiece 1 is shown in Fig. 1 in the area of the steady rest 2 in accordance with the present invention. It rests on support rollers 3 which are mounted so they can rotate freely in legs 4 of the steady rest 2.

[0013] The angle of the legs 4 can be adjusted in relation to the vertical processing center plane 6 by means of a spindle fixture 5. In the sample embodiment illustrated, the spindle fixture 5 consists of two plastic nuts 7 inserted in a pivoting manner in the legs 4, the plastic nuts 7 each having a left-hand or right-hand thread, and a spindle 8 inserted symmetrically in both nuts, this spindle 8 also possessing a left-hand and a right-hand threaded section. Naturally, it is conceivable for a different adjustment fixture to be provided instead of this fixture, for example a spindle with only a right-handed thread which is only mounted in one nut and is fixed on the other leg using a suitable holder.

[0014] By adjusting the legs 4 in different ways in relation to the plane of symmetry 6, it is possible to set the steady rest to different diameters of the workpiece 1 and to adapt it to these diameters.

[0015] Adaptation to different lengths of workpieces 1, as is required in particular when processing natural products, is achieved by means of a length adjustment (Fig. 2) which is not shown in detail but is only indicated schematically and functions using an attachment bracket which can be moved along the slide in the direction of the double-headed arrow F.

[0016] In order to secure the position of the legs 4 in relation to one another and in relation to the axis of symmetry 6, the illustrated sample embodiment possesses gears 10 arranged concentrically to each pivoting axis 9 of the two legs 4, each gear 10 being held in a rotationally fixed arrangement with the legs 4 and each gear 10 engaging in one another, thereby creating a static configuration together with the spindle fixture.

[0017] It is not necessary to use gears 10 with a complete track, as indicated by the dashed position which is drawn for the smallest diameter and below. It is quite sufficient to have an arc of 45° in order for the fixture to function. Since the gearing does not make any major demands in terms of accuracy and no demands whatsoever in terms of smooth running, it is possible and indeed inexpensive to omit the gears 10 and instead make the periphery of the legs 4 with an arc shape and to provide it with teeth, thereby manufacturing the gearing in one piece.

[0018] It goes without saying that it is possible to provide the two legs (if gears 10 are used) with a predetermined movement in relation to these gears in terms of their rotation about the axis 9 and to provide a torsion spring between the gears 10 and each of the legs 4 assigned to them, to enable the contour of non-circular workpieces to be tracked more effectively.

[0019] It also goes without saying that it is possible to provide one or more intermediate steady rests in the case of extremely long workpieces 1 in order to support these workpieces. The materials employed can be those encountered normally in the manufacture of machine tools, however in particular it is also possible to use high-quality plastic for manufacturing not only the support rollers 3 but also the nuts 7 and, under certain circumstances, the spindles 8 as well.

#### Patent claims

1. A steady rest for supporting the free end of long and principally cylindrical workpieces on a machine tool with at least two support rollers (3) that are rotatably mounted in legs (4), in which the legs (4) are held in a pivoting mounting at the ends facing away from the support rollers (3) and a fixing fixture is provided in between the legs (4) by means of which the angle between the legs can be altered and fixed, characterized in that the fixing fixture is a spindle fixture (5) which, in a preferred embodiment, engages on both legs (4).
2. The steady rest in accordance with claim 1, characterized in that the ends of the legs (4) facing towards one another are equipped with toothed arc segments running concentrically to their pivoting axes (9), or that such arc segments are connected to the legs (4) in a rotationally rigid manner.
3. The steady rest in accordance with claim 1, characterized in that the ends of the legs (4) facing towards one another are each equipped with toothed arc segments, and that a torsion spring is provided between the arc segments and each of the legs (4) assigned to them.